

**Assignment #5:**  
**Due July 10**

1. Exercise 15.3-5 (page 350)
2. Consider the activity selection problem discussed before but with profits. Activity  $i$  ( $= 1, 2, \dots, n$ ) has three values associated with it.  $s_i$  the start time,  $f_i$  the finish time and  $p_i$  the profit. We want to select a subset of nonoverlapping activities whose total profit is maximum. Show how to use dynamic programming to solve this problem. (Hint: Read 16.1 in your book)
3. Given a string  $A[1, 2, \dots, n]$  of numbers, find a subsequence  $B[1, 2, \dots, m]$  with  $B[i] < B[i + 1]$  for  $i = 1, 2, \dots, m - 1$  such that the value of  $m$  is maximum.
4. 16.2-2
5. This problem is taken from the book by Tardos and Kleinberg: Consider the following problem faced by an advertising company. Billboards may be placed on a highway at any of  $n$  possible locations that are known to you along a highway. The highway is  $M$  miles long and the locations are at  $x_1, x_2, \dots, x_n$  miles from one end of the highway. Regulations of the highway department prohibit any two billboards from being 5 miles or less apart. Placing a billboard at location  $i$  is worth  $r_i > 0$  to the the advertising agency. The input to the problem are the vectors  $x$  and  $r$  and the value of  $M$  and the separation 5. Give a dynamic programming algorithm to find the optimal set of locations to maximize total revenue.